

Appln. Serial No. 10/751,017  
Amendment Under 37 C.F.R. § 41.33

### AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

- 1 1. (Previously Presented) A method executable by at least one processor in a database  
2 system, comprising:  
3 receiving, by the at least one processor, a query that specifies an aggregate on distinct  
4 values of at least one attribute, the query further specifying grouping on plural grouping sets, the  
5 plural grouping sets having at least a first grouping set and a second grouping set;  
6 identifying, by the at least one processor, distinct values of the at least one attribute and  
7 storing the distinct values of the at least one attribute in a first table;  
8 computing, by the at least one processor, aggregates for groups specified by the first  
9 grouping set using the first table; and  
10 computing, by the at least one processor, aggregates for groups specified by the second  
11 grouping set using the first table.
- 1 2. (Previously Presented) The method of claim 1, wherein the first grouping set is lower  
2 level grouping set than the second grouping set, and wherein the first grouping set has a larger  
3 number of attributes than the second grouping set.
- 1 3. (Original) The method of claim 1, wherein identifying the distinct values of the at least  
2 one attribute comprises computing a group-by operation on the first grouping set and selecting  
3 the attributes of the first grouping set for output.

Appln. Serial No. 10/751,017  
Amendment Under 37 C.F.R. § 41.33

1 4. (Currently Amended) ~~The method of claim 3,~~ A method executable by at least one  
2 processor in a database system, comprising:  
3 receiving, by the at least one processor, a query that specifies an aggregate on distinct  
4 values of at least one attribute, the query further specifying grouping on plural grouping sets, the  
5 plural grouping sets having at least a first grouping set and a second grouping set;  
6 identifying, by the at least one processor, distinct values of the at least one attribute and  
7 storing the distinct values of the at least one attribute in a first table;  
8 computing, by the at least one processor, aggregates for groups specified by the first  
9 grouping set using the first table; and  
10 computing, by the at least one processor, aggregates for groups specified by the second  
11 grouping set using the first table,  
12 wherein identifying the distinct values of the at least one attribute comprises computing a  
13 group-by operation on the first grouping set and selecting the attributes of the first grouping set  
14 for output,  
15 wherein storing the distinct values of the at least one attribute in the first table comprises  
16 storing the distinct values of the at least one attribute in a spool file.

Appln. Serial No. 10/751,017  
Amendment Under 37 C.F.R. § 41.33

1 5. (Currently Amended) ~~The method of claim 3, further comprising:~~ A method executable  
2 by at least one processor in a database system, comprising:

3 receiving, by the at least one processor, a query that specifies an aggregate on distinct  
4 values of at least one attribute, the query further specifying grouping on plural grouping sets, the  
5 plural grouping sets having at least a first grouping set and a second grouping set;

6 identifying, by the at least one processor, distinct values of the at least one attribute and  
7 storing the distinct values of the at least one attribute in a first table;

8 computing, by the at least one processor, aggregates for groups specified by the first  
9 grouping set using the first table; and

10 computing, by the at least one processor, aggregates for groups specified by the second  
11 grouping set using the first table.

12 wherein identifying the distinct values of the at least one attribute comprises computing a  
13 group-by operation on the first grouping set and selecting the attributes of the first grouping set  
14 for output,

15 using the first table to identify distinct values of the at least one attribute for groups  
16 defined by the second grouping set; and

17 storing the distinct values of the at least one attribute for the groups defined by the second  
18 grouping set in a second table.

1 6. (Original) The method of claim 5, wherein computing aggregates for the groups  
2 specified by the second grouping set is based on the second table.

1 7. (Original) The method of claim 6, wherein identifying distinct values of the at least one  
2 attribute for groups defined by the second grouping set comprises computing a group-by  
3 operation on the first able based on the second grouping set and selecting one or more attributes  
4 of the second grouping set for output.

Appln. Serial No. 10/751,017  
Amendment Under 37 C.F.R. § 41.33

1 8. (Original) An article comprising at least one storage medium containing instructions that  
2 when executed cause a system to:

3 receive a query that specifies an aggregate on distinct values of at least one attribute, the  
4 query further specifying grouping on plural grouping sets, the plural grouping sets having at least  
5 a first grouping set and a second grouping set;

6 identify distinct values of the at least one attribute and storing the distinct values of the at  
7 least one attribute in a first table;

8 compute aggregates for groups specified by the first grouping set using the first table; and

9 compute aggregates for groups specified by the second grouping set using the first table.

1 9. (Previously Presented) The article of claim 8, wherein the first grouping set is lower  
2 level grouping set than the second grouping set, and wherein the first grouping set has a larger  
3 number of attributes than the second grouping set.

1 10. (Original) The article of claim 8, wherein identifying the distinct values of the at least  
2 one attribute comprises computing a group-by operation on the first grouping set and selecting  
3 the attributes of the first grouping set for output.

1 11. (Original) The article of claim 10, wherein storing the distinct values of the at least one  
2 attribute in the first table comprises storing the distinct values of the at least one attribute in a  
3 spool file.

Appln. Serial No. 10/751,017  
Amendment Under 37 C.F.R. § 41.33

1 12. (Currently Amended) ~~The article of claim 10, wherein the instructions when executed~~

2 ~~cause the database system to further:~~ An article comprising at least one storage medium

3 containing instructions that when executed cause a system to:

4 receive a query that specifies an aggregate on distinct values of at least one attribute, the

5 query further specifying grouping on plural grouping sets, the plural grouping sets having at least

6 a first grouping set and a second grouping set;

7 identify distinct values of the at least one attribute and storing the distinct values of the at

8 least one attribute in a first table;

9 compute aggregates for groups specified by the first grouping set using the first table; and

10 compute aggregates for groups specified by the second grouping set using the first table.

11 wherein identifying the distinct values of the at least one attribute comprises computing a

12 group-by operation on the first grouping set and selecting the attributes of the first grouping set

13 for output;

14 use the first table to identify distinct values of the at least one attribute for groups defined

15 by the second grouping set; and

16 store the distinct values of the at least one attribute for the groups defined by the second

17 grouping set in a second table.

1 13. (Original) The article of claim 12, wherein computing aggregates for the groups

2 specified by the second grouping set is based on the second table.

1 14. (Original) The article of claim 13, wherein identifying distinct values of the at least one

2 attribute for groups defined by the second grouping set comprises computing a group-by

3 operation on the first able based on the second grouping set and selecting one or more attributes

4 of the second grouping set for output.

Appln. Serial No. 10/751,017  
Amendment Under 37 C.F.R. § 41.33

- 1 15. (Previously Presented) A database system comprising:  
2 a storage to store a table; and  
3 at least one processor to:  
4 receive a query that specifies a calculation of an aggregate on distinct values of an  
5 attribute in the table, the query to specify group-by operations on plural grouping sets;  
6 in processing the query, compute intermediate values for storage in an  
7 intermediate spool; and  
8 use the intermediate values in the intermediate spool for computing results of at  
9 least two group-by operations on at least two corresponding grouping sets.
- 1 16. (Original) The database system of claim 15, wherein the query comprises a Structured  
2 Query Language (SQL) SELECT statement containing a GROUP BY clause specifying multiple  
3 grouping sets.
- 1 17. (Original) The database system of claim 15, wherein the query specifies group-by  
2 operations on plural grouping sets at multiple grouping levels.
- 1 18. (Previously Presented) The database system of claim 15, further comprising database  
2 management software executable on the at least one processor to perform the receiving,  
3 computing, and using acts.
- 1 19. (Original) The database system of claim 18, wherein the database management software  
2 comprises plural access modules, and the storage comprises plural storage modules accessible by  
3 the plural access modules in parallel.
- 1 20. (Original) The database system of claim 19, further comprising plural processors, the  
2 access modules executable on the processors.